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AMERICAN VARIATIONS OF EPILOBIUM, SECTION CHAMAENERION.

M. L. FERNALD.

IN working over the accumulated material of *Epilobium*, Section *Chamaenerion* chiefly from eastern British America, it has been found desirable to recognize a number of well marked varieties, while a detailed study has forced the writer to conclusions different in certain regards from those recorded in some recent papers on the genus. These results, so far as they seem worthy publication, are recorded under the following subtitles.

I. EPILOBIUM ANGUSTIFOLIUM AND ITS VARIATIONS.

THE common Fireweed, *Epilobium angustifolium* L., of northern regions as represented in a large herbarium seems like a hopeless maze of variations, so great is the diversity in stature, size and shape of leaves, size and color of petals, and the degree to which the inflorescence bears leafy bracts. Many authors have segregated the species into several so-called species and others have attempted the segregation of it into forms; Haussknecht, for instance, in his monograph recognizes fourteen forms. For the most part these forms recognized by Haussknecht are without geographic significance and many of them can be found in any region where *E. angustifolium* is abundant. As the species occurs in North America, however, it is divisible into four somewhat pronounced trends which seem to have a marked degree of geographic isolation, although each of these major trends

of the species includes a great number of fluctuations in the size of flowers, length of pedicels, length of capsules and other features which are paralleled by the fluctuations in the others.

Typical *E. angustifolium*, as it occurs in Europe, Asia and generally across the cool-temperate portions of North America, has the leaves long-attenuate at apex and without obvious lateral nerves. This plant commonly reaches a considerable stature, luxuriant colonies being sometimes 2 m. high, although in arid or sterile situations the plant may be only 0.5 m. in height. The inflorescence of this typical *E. angustifolium* is very elongate, tapering at summit, becoming 1.7–7.5 dm. long. This typical form of the species is, as said, widely distributed across North America and is the plant familiar to most people as *E. angustifolium*.

In southern Alaska, especially from the Aleutian Islands to Sitka, occurs an extreme form of the plant with very large leaves and leafy-bracted inflorescences. In this plant the leafy bracts of the raceme are 2.3–4 cm. broad and these, as well as the foliage leaves, have the secondary nerves very prominent beneath. This is the plant described by Haussknecht as *E. angustifolium*, forma *macrophyllum* and said by him to occur in various parts of extreme northern Eurasia but to be absent from North America, except in the Alaskan region. An exactly similar plant, however, occurs on Brion Island, the outermost of the Magdalen Island group in the Gulf of St. Lawrence, a region in which we have learned to expect frequent identities with the plants of the Alaskan area. This plant, in America restricted to Alaska and the Gulf of St. Lawrence region, would seem to be of more than formal value and is here taken up as a definite geographic variety.

The only phase of *E. angustifolium* known to the writer from the coast of Labrador is a dwarf plant often flowering when only 1 dm. high, but in the larger plants attaining a height of 5 dm. In this plant the leaves are very much shorter than in typical *E. angustifolium* and the mature inflorescence is much shorter than in the typical form of the species, the median cauline leaves being only 3–7 cm. long and the mature inflorescences ranging from 0.4–1.3 dm. in length. This extreme variation with short leaves and short inflorescences is a characteristic plant also of Greenland and it occurs locally southward to Newfoundland and to the alpine region of Gaspé County, Quebec. It is the plant described in 1813 by Wormskjold from Greenland as *E. intermedium* and in 1818 by Schrank from Labrador as *E. pauci-*

florum, under which name the plant was taken up by Meyer in his *Plants of Labrador* and by Schlechtendahl in his enumeration of Labrador plants. Lange, in his *Conspectus of the Flora of Greenland*, treats the plant as a pronounced geographic variety, calling it *Chamaenerium angustifolium* β . *intermedium*. This plant certainly seems to be more than a dwarf form of *E. angustifolium*, for, in Newfoundland and in the Shickshock Mountains of Quebec where it occurs, it is found in considerable colonies growing by colonies of the larger plant and it seems there to be an entirely distinct variation. Var. *intermedium*, like true *E. angustifolium* has broad- and narrow-leaved forms, the leaves sometimes being extremely slender and linear, in other colonies more oblong; and the flowers have either large or small petals.

In the arid regions of western North America, especially through the Rocky Mountains of the United States and westward into eastern Washington and Nevada, much of the plant called *E. angustifolium* differs from the typical form of the species and from the varieties above discussed in having the leaves scarcely attenuate at apex but merely acutish or even obtusish, so that in a large series of specimens the leaves appear pronouncedly unlike those of the more widely dispersed plant with long-attenuate leaves. This variation was undoubtedly the basis of *Chamaenerium angustifolium platyphyllum* of Daniels, which was described as having the leaves "merely acutish at apex," although the plant upon which Daniels based the variety was an extreme one with unusually broad leaves and leafy bracts. This Rocky Mountain variant extends eastward locally to Minnesota and it is well developed, like many other Rocky Mountain species and varieties, in the subalpine region of Gaspé County, Quebec, where it is abundant in the meadows and gorges of Table-top Mountain. Like the other varieties of the species, var. *platyphyllum* presents broad- or narrow-leaved phases and large- and small-flowered extremes. These, however, are not sufficiently defined nor of definite enough geographic range to be readily separated.

Typical *E. angustifolium* has the petals of the familiar purple or magenta color which enlivens the clearings and burns of the northern states and Canada. The frequent albino of this typical variety, *E. angustifolium*, forma *albiflorum* (Dumort.) Haussk., has pale whitish-green sepals and white petals. On the Gaspé Peninsula of Quebec, where so many phases of the species are found, occurs a very

beautiful color-form well worthy a place in the garden, with the sepals bright red-purple and the petals white, as in forma *albiflorum*. This is the form described from Lapland as *Chamaenerium angustifolium*, var. *spectabile* by Simmons in 1907, by all means the most handsome color-form of the species.

Briefly summarized, the above notes on the variations of *E. angustifolium* which it seems practical to recognize may be stated as follows:

- A. Leaves long-attenuate at apex. B.
- B. Plant tall, 0.5–2 m. high: median cauline leaves 0.7–2 dm. long: mature inflorescences 1.7–7.5 dm. long. C.
- C. Median leaves 0.5–3.5 cm. broad; the secondary nerves not prominent (except in plants from the most exposed habitats): inflorescences open, with small bracts or if leafy-bracted with the lower bracteal leaves at most 2.5 cm. broad. D.
- D. Petals purple or rose-color. *E. angustifolium* (typical).
- D. Petals white.
- Sepals white. *E. angustifolium*, f. *albiflorum*.
- Sepals red. *E. angustifolium*, f. *spectabile*.
- C. Median leaves 2–4.5 cm. broad; the secondary nerves very prominent beneath: inflorescences leafy-bracted, the lower bracteal leaves 2.3–4 cm. broad. var. *macrophyllum*.
- B. Plant low, 1–5 dm. high: median cauline leaves 3–7 cm. long: mature inflorescences 0.4–1.3 dm. long. var. *intermedium*.
- A. Leaves merely acutish or bluntish. var. *platyphyllum*.

E. ANGUSTIFOLIUM L. Sp. Pl. i. 347 (1753). *Chamaenerion angustifolium* (L.) Scop. Fl. Carn. ed. 2, i. 271 (1772). *E. spicatum* Lam. Fl. Fr. iii. 482 (1778).—In recent clearings, burned lands, damp ravines, etc., chiefly in salicuous or sterile regions of the Canadian and Alleghenian zones.

Forma *ALBIFLORUM* (Dumort.) Haussk. Mon. Gatt. Epil. 38 (1884). *E. spicatum*, β . *leucanthemum* Wender, Bot. Zeit. (1826) i. 356. *E. spicatum* β . *albiflorum* Dumort. Fl. Belg. 89 (1827). *E. angustifolium*, β . *canescens* Wood, Class-book, 262 (1855). *Chamaenerion angustifolium canescens* Britton, Mem. Torr. Bot. Cl. v. 233 (1894).—Occasional throughout the range of the species.

Forma *spectabile* (Simmons), n. comb. *Chamaenerium angustifolium*, var. *spectabile* Simmons, Arkiv för Botanik, vi. no. 17, 14 (1907).—Originally described from Lapland; known in America from QUEBEC: boggy spots, Lac Fortin, Table-top Mountain, Gaspé County, August 9 and 11, 1906, *Fernald & Collins*, no. 660; Flagstaff Peak, Mt. Albert, Gaspé County, July 23, 1906, *Fernald & Collins*, no. 670.

Var. *macrophyllum* (Haussk.), n. comb. *E. angustifolium*, f. *macrophylla* Haussk. Mon. Gatt. Epil. 38 (1884); Kurtz in Engler, Bot. Jahrb. xix. Heft. 4, 381 (1894).—In North America known only from Alaska and from the Magdalen Islands in the Gulf of St. Lawrence. The following specimens belong here. MAGDALEN ISLANDS: sand

dunes, Brion Island, August 6, 1904, *St. John*, no. 1936. ALASKA: Nazan Bay, Atka, 1907, *E. C. Van Dyke*, no. 85; moist meadows, Makushin Bay, Unalaska, August 11, 1907, *Van Dyke*, no. 185; low-land flats, Dutch Harbor, Unalaska, August 13, 1903, *Van Dyke*, no. 199; Nagai Island, Shumagin Islands, August 16, 1872, *M. W. Harrington*; Sitka, 1865–66, *Ferd. Bishoff*.

Var. **intermedium** (Wormsk.), n. comb. *Epilobium intermedium* Wormsk. *Athene* (1813) 83. *E. pauciflorum* Schrank, *Denkschr. Bot. Ges. Regensb.* i. Ab. ii. 15 (1818); Meyer, *Pl. Lab.* 72 (1830); Schlecht., *Linnaea*, x. 96 (1835). *Chamaenerium angustifolium* β . *intermedium* (Wormsk.) Lange, *Med. om Grønland*, Heft. 3, 16 (1880) and 240 (1887).—Greenland, Labrador, Newfoundland, and eastern Quebec. The following are referred here. GREENLAND: without definite locality, *Wormskjold*; Igdlorsuit, west Greenland, August 16, 1881, *Sylow*; Disco, July 23, 1871, *F. M. Fries*. LABRADOR: Rama, August 20–24, 1897, *J. D. Sornborger*, no. 44 (broad-leaved form); spruce grove, Nain, August 11, 1897, *Sornborger*, no. 45 (narrow-leaved form); Hopedale, August 11, 1891, *Bowdoin College Expedition*. NEWFOUNDLAND: Grand Lake, July 15–August 15, 1906, *Owen Bryant*. QUEBEC: common on granitic shores of alpine ponds, Table-top Mountain, Gaspé County, August 7, 1906, *Fernald & Collins*, no. 668.

Var. **platyphyllum** (Daniels), n. comb. *Chamaenerion angustifolium platyphyllum* Daniels, *Univ. Mo. Studies, Sci. Ser.* ii. no. 2, 176 (1911).—Gaspé County, Quebec; Minnesota, Assiniboia, Alberta, and British Columbia south to New Mexico. The following are characteristic specimens. QUEBEC: meadows and cool gorges of Table-top Mountain, Gaspé County, August 2 and 3, 1906, *Fernald & Collins*, nos. 664, 665. MINNESOTA: Center City, June, 1892, *B. C. Taylor*. ASSINIBOIA: Crane Lake, June 30, 1894, *J. Macoun*, no. 4957. MONTANA: Bozeman, September 15, 1901, *W. W. Jones*. WYOMING: Garfield Peak, July 29, 1894, *A. Nelson*, no. 691; moist open woods, Nash's Fork, Albany County, July 28, 1900, *A. Nelson*, no. 7710; alt. 9000 ft., Big Horn Mountains, July 20, 1900, *J. G. Jack*; Flat Creek, Jackson Hole, July 30, 1901, *Merrill & Wilcox*, no. 1110. UTAH: wet canyon, alt. 9000 feet, Geyser Reservoir, July 11, 1912, *E. P. Walker*, no. 263. NEW MEXICO: Mogollon Mountains, alt. 11,000 feet, August 15, 1903, *O. B. Metcalfe*, no. 510. IDAHO: frequent beneath the yellow pines, alt. 4500 feet, Trinity, August 8, 1910, *J. F. Macbride*, no. 531; among willows, frequent, alt. 7000 feet, Silver City, July 21, 1910, *Macbride*, no. 446. NEVADA: moist ravine, alt. 1850–2500 m., Pack's Station, August 4, 1914, *A. S. Hitchcock*, no. 1022. WASHINGTON: Clark Springs, Spokane County, July 10, 1902, *F. O. Kreager*, no. 126; near Egbert Spring, Douglas County, July 5, 1893, *Sandberg & Leiberg*, no. 407; Fort Colville, 1860, *Lyall*.

II. THE ASSUMED HYBRIDIZATION OF *EPILOBIUM ANGUSTIFOLIUM* AND *E. LATIFOLIUM*.

IN 1916, Dr. C. C. Forsaith, writing upon *Epilobium angustifolium* and *E. latifolium*, stated that "when *E. angustifolium* grows within the range of its nearest ally [in North America *E. latifolium*], crosses take place which result in hybrid offspring. This relation is strikingly evident from the morphological standpoint at least, when one takes into account the presence of defective microspores in specimens chosen from that part of its habitat coterminous [coincident?] with that of *E. latifolium*. In contrast to this condition there is the more constant development of the pollen in buds selected from the more southern stations where *E. angustifolium* is practically monotypic."¹

Dr. Forsaith reinforces his argument by the citation of specimens in the Gray Herbarium which had been freely placed at his disposal, indicating by an asterisk those in which he found the pollen defective; he also publishes a map purporting to show the distribution of *E. angustifolium* and *E. latifolium*, indicating in solid black the areas where he believes the two species are coexistent. Lest readers of his article should be led by Dr. Forsaith's courteous reference to members of the staff of the Gray Herbarium (p. 485) to suppose that they indorse the conclusion above quoted, it becomes unfortunately necessary to point out certain facts which might have been detected by Dr. Forsaith himself if he had critically checked his data before publication. The more discerning reader, naturally, will be led to accept with extreme caution the conclusions of a student writing upon geographic distribution who locates Hamilton Inlet in Greenland (p. 477) and the Selkirk Mountains at 118° 20' north longitude (p. 477). Incidentally, if one examines Piper's *Flora of the State of Washington* he will find that *E. latifolium* occurs in Washington only as an arctic-alpine plant and is unknown from the coast, yet Forsaith lists *E. latifolium* with imperfect pollen as represented in the Gray Herbarium from Seattle! The present writer is unable to find any voucher for this statement unless it be a sheet collected by E. C. Smith at 6000 ft. on Mt. Rainier and sent out with the label of the Young Naturalists' Society, SEATTLE.

These, of course, are merely clerical errors and, while showing great

¹ Forsaith, Bot. Gaz. lxii. 475 (1916).

carelessness, may be somewhat pardoned; but the other facts which it seems necessary to emphasize are more fundamental in character. In the first place, *E. angustifolium* and *E. latifolium* are thoroughly distinct in their morphological characters (and by *morphology* is meant not merely what can be seen under a microscope) and in their habitats, and only at the southern or lower limits of the range of *E. latifolium* are they generally coexistent.

Briefly the chief morphological differences between the species may be summarized as follows:

E. angustifolium

Stems solitary or few, erect.

Leaves membranaceous, green above, reticulate-veiny beneath, linear- to oblong-lanceolate, and, except in the arctic-alpine var. *intermedium*, 7–20 cm. long.

Style pilose at base, in maturity exceeding the stamens.

Stigmas slender and elongate, becoming revolute.

Seeds oblong, 1–1.3 mm. long.

E. latifolium

Stems numerous, depressed or arched-ascending.

Leaves thick and fleshy, very glaucous on both surfaces, not veiny, elliptic-ovate to lanceolate, 2–8 cm. long.

Style glabrous, much shorter than the stamens.

Stigmas short and thick, not becoming revolute.

Seeds fusiform, 2 mm. long.

The habitats and ranges of the two species, as already indicated, are likewise very different. *E. angustifolium* is widely dispersed over boreal and cool-temperate regions, extending south in eastern America to North Carolina and Kansas, and growing chiefly in humus or in recently burned areas of the less calcareous regions. *E. latifolium*, on the other hand, is an arctic-alpine calciphile, extending in eastern America south to Newfoundland, Saguenay County and the Gaspé Peninsula, Quebec, and James Bay, the southern lobe of Hudson Bay. Throughout the southern part of its range the plant is local and apparently confined to calcareous or argillaceous river-gravels, its known stations between the Straits of Belle Isle and the Rocky Mountain region being as follows: Forteau, Labrador; 70–80 miles up the Natashquan River, Saguenay Co., Quebec; gravel bars of Mingan River, Saguenay Co., Quebec; gravel deposits of the rivers of Gaspé, Matane and Bonaventure Cos., Quebec, west to the Matane River (longitude 67° 40' w.) and the Grand Cascadepia (longitude 66° w.); Fort George and vicinity, James Bay (longitude 79° w.); St. Mary's River, Alberta (longitude 113° w.). In other words, there is abso-

lutely no evidence known to the taxonomist and the students of our northern floras of *Epilobium latifolium* in the vast Canadian region between the Matane River (longitude $67^{\circ} 40'$ w.) and the east coast of James Bay (longitude 79° w.) nor between Hudson Bay and south-western Alberta (longitude 113° w.); and, consequently, the elongate black area indicated on Dr. Forsaith's map in south-central Canada (from west-central Ontario across the plains of southern Manitoba to southeastern Saskatchewan) is supported by no evidence whatever in the herbarium nor in trustworthy records.

Yet on pages 475 and 476, in the list of specimens of *E. angustifolium* examined by him, Dr. Forsaith marks 12 out of the 18 specimens from eastern Canada (east of the Rocky Mts.) and the Black Hill and Great Lake regions as having imperfect pollen and being, therefore, by his assumed premise, of hybrid origin. According to Müller *E. angustifolium* is visited chiefly by bees, wasps and flies, and in order to gain a conception of the flights required of the bees (the strongest fliers) by Forsaith's inference, that all plants of *E. angustifolium* in southern Canada and the Great Lake region with defective pollen are the results of hybridizing with *E. latifolium*, it is worth while to measure the distances from the nearest stations of *E. latifolium* to the stations of plants of *E. angustifolium* which he considers to be of hybrid origin. His 12 stations between the Straits of Belle Isle and the Rocky Mountains are, therefore, listed below, following the sequence in Dr. Forsaith's paper (beginning with Labrador, crossing the continent to California and Alaska, then back to Greenland and Labrador and retracing a transcontinental route to the Pacific); and after the name of each station is indicated the distance in an air-line to the nearest known station of the very local *E. latifolium*.

Blanc Sablon River, Labrador, 10 miles to Forteau.

Seven Islands, Quebec, 90 miles to Mingan River.

Lake Edward, Quebec, 210 miles (as far as from New York to Washington or from Chicago to Toledo) to Matane River.

Rivière du Loup, Quebec, 125 miles (as far as from New York to Philadelphia or from Chicago to Madison, Wisc.) to Matane River.

Mt. Albert, Quebec, 20 miles and a descent of nearly 4000 feet to the gravel deposits of the lower River Ste. Anne des Monts.

Mungo Park, Lake Nipigon, Ontario, 450 miles (as far as from New York to Raleigh, Eastport or Quebec or from Chicago to Omaha, Kansas City or Buffalo) to Fort George.

Brown Co., Wisconsin, 750 miles (as far as from New York to Milwaukee or Savannah or from Chicago to Bridgeport, Conn., Wilmington, N. C., or Winnipeg) to Fort George.

Crane Lake, Assiniboia, 175 miles (as far as from New York to Boston or from Chicago to Indianapolis) to St. Mary's River.

Table-topped Mt., Quebec, 20 miles and a descent of 3000–4000 feet to the gravel deposits of the lower River Ste. Anne des Monts.

Mt. Albert, Quebec, 20 miles and a descent of nearly 4000 feet to the gravel deposits of the lower River Ste. Anne des Monts.

Turin, Marquette Co., Michigan, 625 miles (as far as from New York to Grand Rapids or Columbia, S. C., or from Chicago to Ottawa or Baltimore) to Fort George.

Pluma, South Dakota, 150 miles (as far as from New York to Harrisburg or from Chicago to Dubuque) to the Rocky Mountains.

Incidentally, the "hybrid" *E. angustifolium* of Surrey, England, listed by Forsaith, is toward 1000 miles (and half that distance across the North Atlantic) from Iceland, the nearest area where *E. latifolium* is indigenous; likewise the production of the "hybrid" *E. angustifolium* from Sapporo, Japan, must have proved a difficult problem for the bees, since it is necessary entirely to leave the Japanese Archipelago in order to find any *E. latifolium*.

These data, easily verified in any large herbarium, should be sufficient to indicate that when Forsaith apologized for the West Virginian specimens with imperfect pollen by saying that these "without doubt, have resulted from physiological conditions" (p. 474), he should have extended a similar explanation for much of the other material with imperfect pollen.

Forsaith states that the hybrid nature of these plants "is strikingly evident from the morphological standpoint"; yet nowhere in his discussion does he make a comparison of the obvious morphological differences of the stems, leaves, styles, stigmas, and seeds, nor suggest that in these most patent characters do the "hybrids" show the slightest degree of blending or of inconstancy. Haussknecht, who freely recognized hybrids in *Epilobium*, and the many other taxonomists who are equally ready to recognize them between some species of the genus, have seen no reason even to surmise that hybridization occurs between *E. angustifolium* and *E. latifolium*; and if Forsaith has made the real discovery that such hybrids exist it is a pity that he did not point out in which of the many strongly divergent characters his hybrids show recombinations. That the two species are highly vari-

able everyone of extended experience knows too well, and it sometimes seems as if De Vries could nowhere have found a better subject for the study of mutations.

In fact, less than two years prior to the publication of Forsaith's paper, Jeffrey made the following seemingly authoritative statement: "all the pollen grains of *Epilobium* (*Chamaenerion*) *angustifolium* are perfectly developed. I have examined the pollen of the species under discussion from widely separate geographical regions and under different conditions of growth and season, with the uniform result, that the pollen is perfect and invariable in any important respect. *E. angustifolium* is a species which apparently is not known to hybridize with other species and indeed it is not easy to see how it could cross with those having their pollen grains in tetrads. The perfection of the pollen in view of this condition appears particularly significant. The failure of *E. angustifolium* to hybridize in nature with other species of the genus is doubtless due to the fact that it is morphologically very distinct from these and would in all probability produce, if artificially crossed, only sterile hybrids."¹ Somewhat earlier, likewise, Jeffrey had asserted with positiveness that the pollen of *E. angustifolium* is perfect, saying in his paper, *The Mutation Myth*, "In all the abundant material of the species examined the pollen was entirely normal."²

In less than two years, then, as indicated by Forsaith's publication from Professor Jeffrey's laboratory, *Epilobium angustifolium*, with the abruptness of a De Vriesian mutation, changed from a species in which "the pollen is perfect and invariable in any important respect" to one in which, in the northern United States and southern Canada, England, Japan, and elsewhere outside the range of any other species with simple pollen grains, the pollen is said to be frequently imperfect. That imperfection of pollen in this species cannot be asserted to be due to hybridization with *E. latifolium* should be apparent from the vast distances (often 100 to 1000 miles and sometimes overseas) between the supposed hybrid offspring and the nearest colonies of one of the assumed parents.

GRAY HERBARIUM.

¹ Jeffrey, *Am. Nat.* xlix. 11 (1915).

² Jeffrey, *Science*, n. s. xxxix. 490 (April, 1914).

ON THE NAMES OF SOME SPECIES OF VIBURNUM.

S. F. BLAKE.

FOR many years a small *Viburnum* of the *V. dentatum* group, strongly marked among our New England species by its very short-petioled leaves and prominent stipules, has been known by the name *Viburnum pubescens* Pursh,¹ based on *V. dentatum* β . *pubescens* Aiton.² While working at the British Museum in 1915, I had an opportunity to examine not only the type of Aiton, on which the specific name must rest, but also the Solander manuscript of the Hortus Kewensis; and the study of this material shows that the name *V. pubescens* can by no means be used for the plant which has borne it so long, but must be applied to the species which was described by Britton³ in 1901 as *Viburnum venosum*.

In the Solander MSS. *Viburnum dentatum* and its varieties are twice dealt with, once on pages 761-763 of volume seven, and again on pages 765-767 of the same volume. The second of these treatments, which is the important one for the determination of the application of the name *V. dentatum* var. *pubescens*, runs as follows:

"dentatum. † *Viburnum* foliis ovatis subcordatis serrato-dentatis plicatis.

"*lucidum*. α . foliis utrinque glabris, petiolis elongatis. *Viburnum dentatum*. *Linn. Spec. pl.* 384. 4.

"*pubescens*. β . foliis ovato-oblongis acuminatis subtus villosis, petiolis elongatis.

¹ Pursh. *Fl. Am.* Sept. i. 202 (1814).

"*V. pubescens*; foliis ovalibus acuminatis dentato-serratis plicato-sulcatis subtus villosotomentosis, cymis pedunculatis, fructibus oblongis.

"*V. dentatum pubescens*. *Ait. kew.* l. p. 168.

"*V. dentatum tomentosum*. *Mich. fl. amer.* l. p. 179.

"In the lower parts of Virginia and Carolina. η . June. *v. v.* The whole of the shrub smaller than the preceding one."

² Ait. *Hort. Kew.* ed. 1. i. 372 (1789); ed. 2. ii. 168 (1811).

"*dentatum*. 8. *V. foliis ovatis dentato-serratis plicatis*. *Sp. pl.* 384. *Jacqu. hort.* l. p. 13. t. 36.

"*lucidum*. α foliis utrinque glabris.

"Shining tooth'd leav'd *Viburnum*.

"*pubescens*. β foliis acuminatis subtus villosis.

"Downy tooth'd-leav'd *Viburnum*.

"*Nat. of North America*.

"*Introd.* 1736, by Peter Collinson, Esq. *Coll. mss.*

"*Fl. June and July*.

H. η ."

³ Britton, *Man.* ed. 1. 871 (1901).

"*sessile*. γ . foliis ovatis acutis subtus villosis, petiolis brevissimis hirtis.

"Habitat in America septentrionali prope Montes Kattskill. J. Bartram. Frutex vix tripedalis. J. Bartram. Obs. Hoc... [illegible] — distincta species?"

The types of these three varieties are all in the British Museum. The type of *a. lucidum*, from "America sept. J. Bartram 1764 [after which 77 has been written in pencil]" is good *V. dentatum* L. as now taken by all authors. The type of β . *pubescens*, marked "Hort. Dr. Lee," and labeled in Solander's own hand, is a characteristic specimen of the plant now passing as *V. venosum* Britton. A tracing of this specimen is now in the Gray Herbarium. The type of γ . *sessile*, a flowering scrap with a detached leaf and portion of cyme, labeled "America sept. Katskill mountains J. Bartram 1764 [after which 74 is added in pencil] 3 pedalis," is the species now passing as *V. pubescens* (Ait.) Pursh and so designated, for instance, in the last edition of Gray's Manual.

By reference to the treatment in Aiton's Hortus Kewensis as issued, given in a previous footnote, it will be seen that Solander's γ . *sessile* was dropped entirely, and that there is consequently no reference in that work to the plant now called *V. pubescens*. Pursh's name *V. pubescens*, being based directly on the β . *pubescens* of Aiton, must therefore be transferred to the species now called *V. venosum* Britton. It is probable, furthermore, that the plant which Pursh really had in mind as *V. pubescens* was *V. venosum*, for the only specimens of the *V. dentatum* group collected by Pursh which I was able to find at the Kew Herbarium consisted of a branch of *V. venosum* on a sheet with two scraps of the somewhat pubescent form of *V. dentatum*, the whole labeled *Viburnum dentatum* in an old hand which Mr. Skan, the librarian at Kew, was not able to identify.

The oldest name which has been considered to refer to the short-petioled plant, the *V. pubescens* of authors but not of Pursh, is *Viburnum villosum* Raf. Med. Rep. N. Y. hex. II. v. 361 (1808). Rafinesque's name being debarred from use in any case, because of an earlier and valid *V. villosum* of Swartz (1788), his plant was renamed *V. Rafinesquianum* by Schultes in 1820 (Syst. vi. 630). Although this name (*V. villosum* Raf.) may perhaps refer to the short-petioled plant, it is so poorly described and figured (in an inedited plate of Rafinesque) that its adoption for our plant seems very undesirable.

Rafinesque's description reads only "*Viburnum villosum*; leaves ovate, serrated, hairy, umbell [sic] 5 fidous, few flowered. Grows in Pennsylvania." This description is unfortunately too brief and indefinite to exclude *V. venosum* (i. e., the true *V. pubescens*) or *V. scabrellum* (T. & G.) Chapm., both of which also occur in Pennsylvania, and the character "umbell 5 fidous" is one not known, at least normally, in any of these species, all of which have a consistently 7-rayed umbel. The plate to which reference has been made throws no further light on the question. It is a tracing, executed many years ago for Dr. Sereno Watson, of the unique proof of one (no. 17) of a series of plates intended to illustrate Rafinesque's "Select New Plants of North America," but lost in his perhaps fortunate shipwreck of 1815 and consequently never published.¹ This tracing shows a plant with 5-rayed short-villous umbel, few flowers, oval-ovate obtusish or acutish, densely ciliolate leaves, short, ciliolate, estipulate petioles, and short-villous stem, and on the whole bears perhaps more resemblance to *V. scabrellum* than to *V. "pubescens."* However, as it seems impossible ever to identify it with any certainty, the name had best be dropped entirely, and with it the *V. Rafinesquianum* of Schultes, which rests directly on it.

No other name seems to have been given to any form of the short-petioled plant² until 1911, by which date the name *V. pubescens* had become firmly fixed by universal usage on the very short-petioled and pubescent form of the East. In that year a form from Missouri, which had been distributed and also grown at the Arnold Arboretum under the name *V. affine* Bush, was briefly characterized by Schneider under that name in his Handbuch as a doubtfully distinct species, and was shortly after reduced by Rehder to a variety of *V. pubescens* (of authors), and distinguished by its somewhat longer petioles and less pubescent leaves.

Examination of all the material of the so-called *V. pubescens* at the Gray Herbarium and the Arnold Arboretum fully confirms Mr. Rehder's view that two varieties of the old "*V. pubescens*" may be distinguished with fair clearness. One, with leaves rather densely soft-pubescent all over the under surface, between as well as on the

¹ An account of this collection of plates, by W. R. G[erard], will be found in Bull. Torr. Club xii. 37-38 (1885).

² The name *Viburnum pubescens* var. *petiolum* (sic) Fitzpatrick (T. J. & M. F. L.), Proc. Iowa Acad. Sci. vii. 198 (1900), refers very clearly to *V. molle* Michx. (*V. Demetronis* Deane & Robinson).

veins, is the common eastern plant, extending south and west to Georgia, Michigan, and Manitoba. In this plant the petioles are generally very short, 3–7 mm. or even less, although sometimes somewhat longer. In the other plant, which must be considered the typical form of *V. affine* as here taken, the leaves are pilose beneath only along the veins and in their axils, not between them, and the petioles are commonly longer (12 mm. or less). This plant is of more restricted and western range, being represented in the two herbaria consulted only from Ontario, Illinois, Iowa, Minnesota, Virginia, and Missouri. Mr. Rehder tells me that both these varieties have retained their distinctive characters during a number of years' cultivation at the Arnold Arboretum.

It seems best, therefore, to adopt for the plant which has been passing as *Viburnum pubescens* (Ait.) Pursh the name *V. affine* Bush, and that it may be eligible for use under the International Rules, to provide it with a Latin diagnosis, as follows.

VIBURNUM AFFINE Bush.—*V. affine* Bush! ex Rehder in Sarg. Trees & Shrubs i. 135 (1903), nomen; ex Schneider, Ill. Handb. Laubholz. ii. 649. f. 415, *l-m* (1911), without Lat. diag. *V. pubescens* var. *affine* (Bush) Rehder, Mitt. Deutsch. Dendr. Gesell. 1913. 263 (1913), without Lat. diag. *V. pubescens* auth., not Pursh.—Frutex. Folia ovata acuta dentata (dentibus 4–9-jugis) supra sparse pilosa vel glabrata subtus plus minusve dense pilosa (pilis simplicibus) venosa (venis 5–7-jugis) 3.5–7 cm. longa 2.3–4.2 cm. lata, in petiolis 2–12 mm. longis ad basin conspicue 2-stipulatis. Cymi 7-radiati, floribus ca. 6 mm. latis. Drupae purpureae, putamine compresso in faciebus leviter 2-sulcato.—Represented in the Gray Herbarium from Vt. south to Ga. and west to Mo. and Manitoba.

The species may be separated into the two following varieties.

Var. **affine** (Bush) comb. nov. (typical form).—Folia subtus in venis et in axillis venarum plus minusve pilosa ceterum glabra; petioli saepe usque ad 12 mm. longi.—*V. affine* Bush. *V. pubescens* var. *affine* (Bush) Rehder.—Ont., Ill., Minn., Ia., Va., and Mo.

Var. **hypomalacum**, var. nov. Folia subtus dense pilosa; petioli saepius 3–7 mm. longi.—*V. pubescens* of most auth., not Pursh.—Type from VERMONT: Ferrisburg, fl. 17 June 1881, fr. 7 Aug. 1880, C. E. Faxon (TYPE in Gray Herb.).—Vt. and Ont. to Ga., Mich., and Manitoba.

Another *Viburnum*, the name of which has become somewhat confused, is the American form of *V. Opulus* L., which has commonly been called *V. Opulus* L. var. *americanum* (Mill.) Ait., a name said to rest on *V. americanum* Mill. Gardn. Dict. ed. 8. no. 8 (1768). The type of *Viburnum americanum* Miller in the British Museum, however,

is nothing more nor less than *Hydrangea arborescens* L. The name *V. OPULUS* var. *AMERICANUM* Ait. Hort. Kew. i. 373 (1789) (as β . *americana*), which was published without reference to Miller's name, may continue in use for the plant.

The changes in nomenclature here proposed may for convenience of reference be summarized as follows.

VIBURNUM AFFINE Bush.—*V. pubescens* auth., not Pursh. For varieties, see discussion.

VIBURNUM PUBESCENS (Ait.) Pursh.—*V. venosum* Britton.

V. PUBESCENS (Ait.) Pursh var. **Canbyi** (Rehder).—*V. venosum* var. *Canbyi* Rehder, RHODORA vi. 60 (1904).

V. PUBESCENS (Ait.) Pursh var. **longifolium** (Dippel).—*V. dentatum* var. *longifolium* Dippel, Handb. Laubholz. i. 183 (1889). *V. longifolium* "Loddiges" Zabel, in Beisner, Schelle, & Zabel, Handb. Laubholz-Ben. 441 (1903). *V. venosum* var. *longifolium* (Dippel) Rehder, RHODORA vi. 61 (1904).

VIBURNUM OPULUS L. var. *AMERICANUM* Ait.—*V. Opulus* var. *americanum* "(Mill). Ait." of auth.

GRAY HERBARIUM.

REPORTS ON THE FLORA OF THE BOSTON DISTRICT,—XXVI.

ROSACEAE.

AGRIMONIA.

A. gryposepala Wallr. Rich woods and thickets, frequent.

A. mollis (T. & G.) Britton. Moist woods, Oak Island, Revere; open woods on talus of diorite, Horn Pond Mt., Woburn.

A. striata Michx. Woods and roadsides. No stations reported from southeastern towns; frequent elsewhere.

ALCHEMILLA.

A. VULGARIS L., var. **VESTITA** (Buser) Fernald & Wiegand. Five plants in a chicken-yard, Westford (*Emily F. Fletcher*, September 22, 1906, in RHODORA ix. 92, 1907, as *A. pratensis* F. W. Schmidt). See Fernald & Wiegand, RHODORA xiv. 233, 1912.

AMELANCHIER.

See RHODORA xiv. 117-161, 1912.

A. laevis Wiegand. Woods and thickets. Not reported from southeastern towns, but reported as common elsewhere.

A. oblongifolia (T. & G.) Roem. Swamps, thickets and roadsides, very common throughout.

A. sanguinea Wiegand. Rich woods, Groton (*C. H. Knowlton*, May 13, 1905). See RHODORA xiv. 240, 1912.

A. stolonifera Wiegand. Dry sandy soil and ledges, common throughout. A form with small petals has been discussed in RHODORA x. 33, 1908, by B. L. Robinson, as var. *micropetala*; in RHODORA xiv. 132-134, 1912, by K. M. Wiegand, as a possible hybrid (*A. oblongifolia* \times *stolonifera*); and in RHODORA xviii. 48-49, 1916, by C. A. Weatherby, as a teratological form.

A. laevis Wiegand \times **A. oblongifolia** (T. & G.) Roem. Frequent where both species are found.

CRATAEGUS.

C. alnorum Sarg. Dedham (*E. F. Williams*, May 24, 1896).

C. apposita Sarg. Tyngsboro (*F. S. Collins*, May 15, 1910); Hopkinton (*F. S. Collins*, May 30, 1887).

C. Arnoldiana Sarg. Bussey Brook, Arnold Arboretum, type station (*J. Robinson*, May, 1880, et al. to date); Lowell (*C. H. Morss*, May 28, 1901); Medford (*L. L. Dame*, —, 1887); Mystic Pond near end of Hastings Lane, Medford (*C. S. Sargent*, Sept. 7, 1901).

C. Brainerdi Sarg., var. **Egglestoni** (Sarg.) Robinson. One station, Wellesley (*K. M. Wiegand*, —, 1909).

C. CRUS-GALLI L. Introduced near Jamaica Pond [W. Roxbury] (*C. E. Faxon*, no date).

C. intricata J. Lange. (*C. coccinea* Eggleston in Gray's Manual, ed. 7, 1908). Peabody, Winthrop, Dedham, Sharon, Southborough, Medfield.

C. macrosperma Ashe. Pastures and thickets, frequent.

C. macrosperma Ashe, var. **acutiloba** (Sarg.) Eggleston. Occasional.

C. macrosperma Ashe, var. **pastorum** (Sarg.) Eggleston. Wellesley (*K. M. Wiegand*, Sept. 20, 1909).

C. MONOGYNA Jacq. (*C. Oxyacantha* of Gray's Manual, ed. 7, 1908). Persistent and occasionally spontaneous, especially near Boston.

C. PHAENOPYRUM (L. f.) Medic. Escape in pasture, Dorchester (*J. R. Churchill*, Oct. 17, 1886 et seq.); Jamaica Plain (*C. E. Faxon*, Sept. 26, 1883 et seq.). Introduced from the South.

C. pruinosa (Wendl.) C. Koch. Ashland (*Thomas Morong*, June 5, 1882). Specimen in herb. Walter Deane. A plant of this species with bluish leaves was transplanted from Orient Heights, Winthrop, in October, 1899, by C. E. Faxon and J. T. Dawson, and is growing in the Arnold Arboretum (No. 4572).

C. pruinosa (Wendl.) C. Koch., var. **conjuncta** (Sarg.) Eggleston. Topsfield (*T. E. Proctor*, Oct. 22, 1900, June 7, 1901); Southborough (*C. S. Sargent*, Sept. 4, 1904). Specimens in herb. Arnold Arboretum.

C. pruinosa (Wendl.) C. Koch., f. **dissona** (Sarg.) Eggleston. Dry roadside, Franklin (*K. M. Wiegand*, Sept. 13, 1911).

C. rotundifolia Moench. Frequent; all reported stations north of Boston.

C. rotundifolia Moench., var. **Faxoni** (Sarg.) Eggleston. Needham (*K. M. Wiegand*, Aug. 27, 1909).

C. submollis Sarg. Wall near Prof. Sargent's, Perkins St., Jamaica Plain type station (*C. E. Faxon*, May 14, Sept. 17, 1902). Also reported from N. Andover, Andover, Lowell, Chelmsford, Revere, Winthrop, Medford and Milton.

C. succulenta Schrad. (*C. macracantha* Lodd.) W. Newbury (*A. A. Eaton*, —, 1896); Ipswich (*Wm. Oakes*, no date; *C. S. Sargent*, Sept. 13, 1900); Revere (*H. A. Young*, —, 1877; *C. E. Faxon*, Sept. 27, 1883.)

DALIBARDA.

D. repens L. Deep woods; Middleton (*J. H. Sears*, Aug. 20, 1883); Manchester (*J. Robinson*, June 3, 1875); Holbrook (*Alice G. Clark* in *RHODORA* vi. 227, 1904).

EXOCHORDA.

E. GRANDIFLORA (Hook.) Lindl. Spreading and forming thicket on rocky knoll, site of abandoned garden, Arlington (*C. A. Weatherby*, Aug. 4, 1908, May 15, 1909). Native of central China.

FILIPENDULA.

F. ULMARIA (L.) Maxim. An infrequent escape from gardens to moist soil.

FRAGARIA.

F. GRANDIFLORA Ehrh. Dump near Charles River Road, Cambridge (*A. S. Pease*, May 27, 1905); roadside thicket near garden, Lynnfield (*M. L. Fernald*, June 16, 1907). Common garden strawberry. Probably frequent.

F. VESCA L. Dry soil, occasional.

F. VESCA L., var. **americana** Porter. Rich woods, rare; Boxford, Woburn, Stoneham, Norfolk.

F. virginiana Duchesne. Fields and meadows, very common throughout.

GEUM.

G. canadense Jacq. Moist shady places, common throughout.

G. rivale L. Meadows and swamps, common.

G. strictum Ait. Meadows and moist roadsides, occasional from Blue Hills northward.

G. URBANUM L. South Salem (*J. H. Sears*, July 10, 1885). Thoroughly introduced in Cambridge (*W. Deane*, July 2, 1884 to date); appearing in cultivated ground, rare, Wellesley (*F. W. Hunnewell 2d*, June 10, 1912).

G. virginianum L. Swamps and wet places, occasional from Cambridge to Norwood and Sherborn and northward.

PHYSOCARPUS.

P. OPULIFOLIUS (L.) Maxim. Persistent or escaping at Lowell, Cambridge, Melrose and Milton; perhaps elsewhere.

C. H. KNOWLTON } *Committee on*
WALTER DEANE } *Local Flora.*

THE AMERICAN RANGE OF *BOTRYCHUM LANCEOLATUM*.¹— In recognizing as a distinct species, *Botrychium angustisegmentum*,² the Appalachian plant previously described as *B. lanceolatum* var. *angustisegmentum* Pease & Moore,³ Professor Fernald has pointed out that in Europe true *B. lanceolatum* is a subarctic or arctic-alpine plant of limited distribution, and has discussed its American range as follows: "In North America it occurs within the Arctic Circle in Greenland (latitude 63° N.) but is unknown elsewhere in the East; in the West it extends from the Aleutian Islands to Mount Ranier in Washington and the Selkirk Mts. in British Columbia. South and east of these mountain stations its occurrence is doubtful, for although often said to reach Colorado, it is noteworthy that in preparing his *Flora of Colorado* Rydberg was unable to verify its occurrence there." Subsequently⁴ Mr. F. W. Hunnewell reported having collected a specimen in the Yellowstone National Park, Wyoming, in 1914; and there is a Yellowstone specimen in the National Herbarium, collected many years before by Frank Tweedy.

Botrychium lanceolatum occurs in Colorado and Quebec, also, as shown by specimens in the National Herbarium. The Colorado collections are two: "Mt. Antero, spur of Sawatch Range," Aug. 1880, T. S. Brandegee; and "Glacier Lake, alt. 8,500 ft., on dry gravelly slopes composed of disintegrated granites," July 5, 1914, E. Bethel. Mt. Antero, named for an Indian chief, is in the region of Mt. Yale and Mt. Princeton. Mr. Brandegee writes that there are three Colorado specimens in his own herbarium, marked as collected by him in 1880 at an altitude of 10,500 feet in the Sawatch range. The Glacier Lake specimen of Mr. Bethel is large and complete, and altogether characteristic.

The Quebec record rests upon excellent specimens collected by Mr. William Palmer, Aug. 17, 1887, among grasses on a sandy beach at the mouth (eastern side) of the Mingan River, but a few rods distant from the Gulf of St. Lawrence. This extension of range, though notable, is not surprising.— WILLIAM R. MAXON, Washington, D. C.

[Besides the southern stations for *B. lanceolatum* recorded by Mr. Maxon the following may now be added: In sand, Pt. aux Basques, Seven Islands, Saguenay Co., Quebec, 1907, C. B. Robinson, no. 836

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² RHODORA 17: 87. 1915.

³ RHODORA 8: 299. 1906.

⁴ RHODORA 17: 143. 1915.

(Herb. N. Y. Bot. Gard.); near timber line, alt. 10,000–12,000 feet, high mountains about Gray's Peak, Colorado, August 20, 1885, *H. N. Patterson*, no. 164, in part (in Gray Herb.). Patterson's no. 164 was distributed as *B. Lunaria*, the material of this number in the Gray Herbarium consisting of three typical plants of that species and one of *B. lanceolatum*. Following the clew given by Maxon, an examination of an envelope of Brandegee's material in the Gray Herbarium from the Sawatch Range, labeled *B. Lunaria*, reveals seven plants of that species and one of undoubted *B. lanceolatum*. These two mixtures of *B. lanceolatum* with *B. Lunaria* indicate that *B. lanceolatum* should be sought where *B. Lunaria* occurs.—M. L. F.]

ADDITIONAL WOOL WASTE PLANTS.—Miss Emily F. Fletcher, who has so frequently recorded interesting foreign plants appearing on fields fertilized with wool waste, has recently sent some notable specimens to the Gray Herbarium. At North Chelmsford she found *Erodium laciniatum* (Cav.) Willd., var. *Bovei* (Delile) Murbeck, a native of Egypt, Tunis, and Algiers. At Westford she collected *Sphaeralcea Fendleri* Gray, a native of western Texas, Arizona, etc. Her most dramatic discovery was the occurrence at Westford of *Wissadula callimorpha* (Hoche) Hassl., var. *Friesii* Hassl., a native of eastern Bolivia and adjacent Brazil, which was not known to science until 1906, and even now is represented by only three collections. Miss Fletcher has inquired at the mill and ascertained that among the various sheep-raising districts from which wool was imported during the last two years to Westford, was "South America as far south as Chile and Argentine." This is circumstantial evidence which helps to explain the presence of this unusual plant in Massachusetts.—HAROLD ST. JOHN, Gray Herbarium.

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